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10/663,299

09/15/2003

Haichao Liu

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05/26/2006

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EXAMINER

PUTTLITZ, KARL J

ART UNIT

PAPER NUMBER

1621

DATE MAILED: 05/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/663,299

Applicant(s)

LIU ET AL.

Examiner

Karl J. Puttlitz

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-67 is/are pending in the application.
- 4a) Of the above claim(s) 29-67 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>11/18/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Applicant's election of Group I, claims 1-28 in the reply filed on 11/18/2005 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Information Disclosure Statement

The reference by Liu et al. (reference "BB") of the information disclosure statement filed 11/18/2005 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because "[e]ach publication must be identified by publisher, author (if any), title, relevant pages of the publication, and date and place of publication" see MPEP § 609. The Liu et al. reference fails to recite a date. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609.05(a).

Specification

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet .

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are:
Claim 1 fails to recite what products are prepared by the process and therefore lack an essential step in the process.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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Claims 1, 2, 6, 8, 11, 12, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguchi et al., Supported Ruthenium Catalyst for the Heterogeneous Oxidation of Alcohols with Molecular Oxygen, Angew. Chem. Int. 2002, 41, No. 23, pp. 4538-4542 (Yamaguchi).

The rejected claims cover a process for the oxidation of methanol, ethanol, or mixtures thereof comprising contacting the methanol and/or ethanol with an oxygen-containing gas and a supported catalyst comprising one or more platinum group metal oxides.

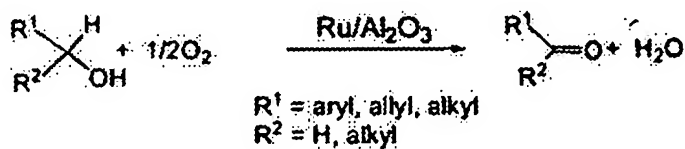
The rejected claims also cover those embodiments for the oxidation of methanol and/or ethanol.

The rejected claims also cover those embodiments wherein the support comprises a material selected from alumina, silica, zirconia, titania, and mixtures thereof.

The rejected claims also cover those embodiments wherein the support comprises alumina.

The rejected claims also cover those embodiments wherein the catalyst comprises one or more ruthenium oxides.

With regard to the embodiments above, Yamaguchi teaches the following reaction at page 4538, left column:



The difference between the process covered by the rejected claims and the process disclosed by Yamaguchi is that Yamaguchi fails to explicitly teach the oxidation of methanol or ethanol. However, given the above formula, Yamaguchi suggest methanol and ethanol with the requisite particularity such that oxidation of these starting materials would be well within the motivation of those of ordinary skill, and thus, prima facie obvious.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguchi in view of Tanaka et al., Chemistry Letters (1994), (4), 809-12, Chemical Abstracts online citation [retrieved 19 April 2006] on CAPLUS on STN, Columbus OH, USA, Accession No. 1994:422227 (Tanaka).

Claim 7 covers those embodiments wherein the process comprises oxidation of ethanol to produce primarily diethoxyethane. Yamaguchi fails to explicitly teach this requirement. However, it is or this proposition the examiner joins Tanaka. Specifically Tanaka demonstrates that diethoxyethane is a primary product of ethanol oxidation using supported catalysts. Therefore, the requirement that diethoxyethane be produced by the oxidation of ethanol is well within the motivation of those of ordinary skill, and thus, prima facie obvious.

Claims 1-6, 9-13, 16-20, and 24-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 65123 (JP 123) in view of Mallat et al., Oxidation of alcohols with

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molecular oxygen on platinum metal catalysts in aqueous solution, *Catalysis Today*, 19 (1994) 247-284 (Mallat).

The rejected claims cover a process for the oxidation of methanol, ethanol, or mixtures thereof comprising contacting the methanol and/or ethanol with an oxygen-containing gas and a supported catalyst comprising one or more platinum group metal oxides.

The rejected claims also cover those embodiments wherein the oxidation is of methanol.

The rejected claims also cover those embodiments wherein the process comprises primarily methyl formate.

The rejected claims also cover those embodiments wherein product of the process comprises dimethoxymethane and/or formaldehyde.

The rejected claims also cover those embodiments wherein the product further comprises dimethoxymethane and/or formaldehyde.

The rejected claims also cover those embodiments wherein the support is a material selected from alumina, silica, zirconia, titania, and mixtures thereof.

The rejected claims also cover those embodiments wherein the support comprises stannic oxide.

The rejected claims also cover those embodiments wherein the support comprises one or more reducible metal oxides; wherein the one or more reducible metal oxides are selected from reducible oxides of tin, iron, cerium, manganese, cobalt, nickel, chromium, zirconium, rhenium, titanium, silver and copper, and mixtures thereof.

The rejected claims also cover those embodiments wherein the support comprises one or more layers of a reducible metal oxide or a mixture of such oxides disposed on a particulate alumina, silica, zirconia, or titania.

The rejected claims also cover those embodiments wherein the support comprises a layer of stannic oxide disposed on a particulate alumina, silica, titania, or zirconia.

The rejected claims also cover those embodiments wherein the catalyst comprises one or more rhodium oxides.

The rejected claims also cover those embodiments wherein the catalyst comprises one or more palladium oxides.

The rejected claims also cover those embodiments wherein the temperature is from about 30 to about 300°C, or from about 50 to about 180°C, or from about 80 to about 180°C.

With regard to the above embodiments, JP 884 teaches a process for the oxidation of methanol with oxygen over a catalyst comprising iridium and rhodium and a proton conductor, which produces methyl formate, formaldehyde, and dimethoxymethane, see attached abstract from JPO [retrieved on 11 April 2006] in EAST.

The difference between the process covered in the rejected claims and the process disclose in JP 123 is that the patent fails to disclose that the catalysts are supported including a reducible metal oxide or a mixture of such oxides. It is for this proposition, however, that the examiner joins Mallat. Specifically, this reference

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teaches oxidation of simple alcohols, for example, at page 250. The catalyst may be composed of active metal, promoter, and support, see page 249, which can include palladium (see claim 25). Such promoters include tin, which is oxidized to stannic oxide, see page 250. At page 273, the reference schematically depicts the surface of the catalyst, as required by claims 9 and 10:

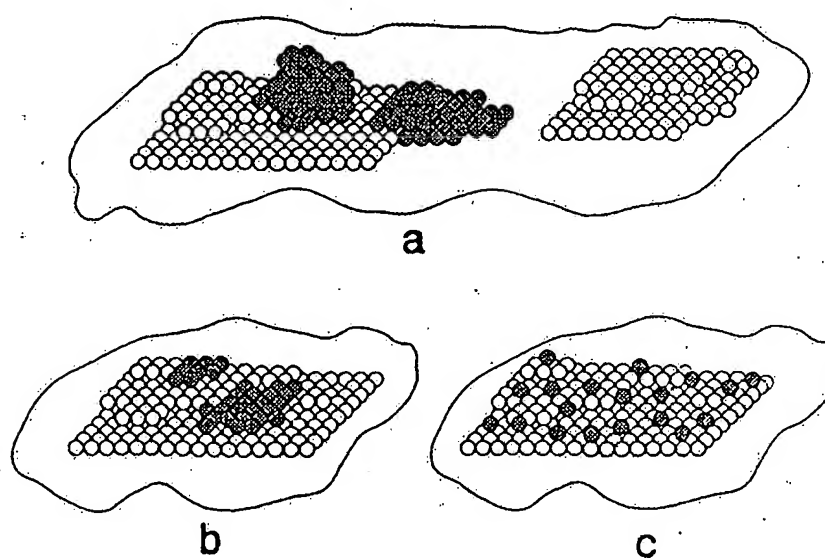


Fig. 6. Schematic representation of promoter (black) deposition on Pt metal (white) particles: (a) bulk (metallic) crystallite on the platinum metal or on the support. (b) adatoms in clusters. (c) isolated adatoms.

The supports include, for example, alumina and silica, see page 250. With regard to the recited temperatures, these process conditions are held to be within the motivation of those of ordinary skill in order to optimize the reaction, see M.P.E.P. § 2144.05 ("Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "[W]here the general conditions

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of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955)").

Based on the foregoing, those of ordinary skill would have been motivated to modify JP 123 to include the required supports including a reducible metal oxide or a mixture of such oxides, since Mallat teaches, by way of a review of the art, that these catalyst structures are routine and advantageous in the art of alcohol oxidation, (The strongest rationale for combining references is a recognition, expressly or impliedly in the prior art or drawn from a convincing line of reasoning based on established scientific principles or legal precedent, that some advantage or expected beneficial result would have been produced by their combination. *In re Sernaker*, 702 F.2d 989, 994-95, 217 USPQ 1, 5-6 (Fed. Cir. 1983). See M.P.E.P. § 2144. Accordingly, the rejected claims are prima facie obvious since the combination of JP 123 and Mallat teaches the elements of these claims with a reasonable expectation of success.

Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 123 in view of Mallat as applied to claims 1 and 11 above, and further in view of Kirk-Othmer Encyclopedia of Chemical Technology Copyright © 2002 by John Wiley & Sons, Inc., pp. 200-254 (Kirk Othmer).

Claims 14 and 15 cover those embodiments wherein the support comprises zirconia and titania. Neither JP 124 nor Mallat explicitly teach these requirements of the

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claimed invention. It is for this proposition, however, that the examiner joins Kirk Othmer. Specifically, Kirk Othmer teaches that common catalyst supports include zeolites, see, for example, page 227. Those of ordinary skill would therefore be motivated to modify JP 123 and Mallat to include zeolites such as zirconia and titania since these zeolites are routine catalyst supports, as evidenced by Kirk Othmer. Therefore, claims 14 and 15 are prima facie obvious since the combination of JP 123, Mallat and Kirk Othmer teaches the elements of these claims with a reasonable expectation of success.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karl J. Puttlitz whose telephone number is (571) 272-0645. The examiner can normally be reached on Monday to Friday from 9 a.m. to 5 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Johann Richter, can be reached at telephone number (571) 272-0646. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Karl J. Puttlitz
Assistant Examiner